ABSTRACT OF THE DISCLOSURE

The present invention provides a method and apparatus for optical spectral power monitoring employing novel frequency-division-multiplexing detection schemes. The optical spectral power monitoring apparatus of the present invention uses a wavelength-dispersing means (e.g., a diffraction grating) to separate a multi-wavelength optical signal into multiple spectral channels, and an array of beam-modulating elements (e.g., micromirrors) positioned such that each beam-modulating element receives a unique one of the spectral channels. The beam-modulating elements are individually controllable such that the optical power levels of the spectral channels coupled into an output port carry distinct dither modulation signals. By performing a synchronous detection of the dither modulation signals, in conjunction with a predetermined calibration table, an optical power spectrum of the multi-wavelength optical signal can be derived. Such dither modulation signals may also be used as "identification markers" (or frequency tags) for identifying individual spectral channels in an optical networking application.